



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/698,862	10/27/2000	Charles L. Hunter	10001746-1	5899

22879 7590 07/19/2004

HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER

CASTRO, ANGEL A

ART UNIT

PAPER NUMBER

2653

DATE MAILED: 07/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/851,892

Applicant(s)

RAMSEY, JEFFREY

Examiner

Harry Vartanian

Art Unit

2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 22 is/are allowed.
- 6) ☒ Claim(s) 1-5,7-17 and 19-21 is/are rejected.
- 7) ☒ Claim(s) 6 and 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 May 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Detailed Action

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 116. Corrected drawing sheets, or amendment to the specification to add the reference character(s) in the description, are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

The following Claims are objected:

1. Claim 1 recites the limitation "the channel" in lines 15 and 17. There is insufficient antecedent basis for this limitation in the claim.
2. Claims 5 and 7 recite the limitation "the phase angles". There is insufficient antecedent basis for this limitation in the claim.

Art Unit: 2634

3. Claim 8 recites the limitation "the channel". There is insufficient antecedent basis for this limitation in the claim.

4. Claims 11, 12, 19, 20 recite the limitation "the phase angles". There is insufficient antecedent basis for this limitation in the claim.

5. Claim 16 recites the limitation "two of the phase angles". There is insufficient antecedent basis for this limitation in the claim. A recommended change would be "***two phase angles***".

6. Claim 22 recites the limitation "two of the phase angles". There is insufficient antecedent basis for this limitation in the claim. A recommended change would be "***two phase angles***".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Art Unit: 2634

7. Claim 1-3, 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terreault et al(USPUB 2002/0064233) in view of Kakuishi et al(US Pat 5,481,564).

Terreault et al meets the following limitations of Claim 1:

the processor operable to generate a phase response of the channel based upon the set of equalizer coefficients; **para 15; para 0054; Claim 17**

generate a group delay for the channel based upon the generated phase response. **Para 0054; Claim 17**

In his non-intrusive(Para 13) group delay estimation system, Terreault et al fails to teach the use of an adaptive equalizer and weight update device that will adjust itself based on the group delay measurements.

However, Kakuishi et al's receiver meets the following limitations:

an adaptive equalizer operably coupled to receive a demodulated digital signal, the adaptive equalizer operable to generate an equalized signal using a set of equalizer coefficients; **fig 8; (Column 8, Lines 10-19); (Column 5, lines 46-53)**

a weight update device operable to generate the set of equalizer coefficients using an error signal, the error signal representative of a difference between an ideal demodulated signal **fig 8; (Column 8, Lines 10-19); (Column 5, lines 46-53)**

Therefor it would have been prima facie obvious for Terreault's group delay measurement system to have an adaptive equalization system to react to changing group delays. The motivation to combine is stated by Kakuishi wherein he states the advantage of using an adaptive equalizer over a static equalizer is that an adaptive equalizer can adjust under changing channel conditions and cable lengths(See column 1, lines 33-43). Kakuishi also focuses on using his adaptive equalizer for "adjusting group delay"(Column 8, Lines 11-12).

Regarding Claim 2, Terreault et al meets the following limitations of the Claim:

said processor is operable to perform a discrete Fourier transform to generate the phase response **para 161;**

Regarding Claim 3, Terreault et al meets the following limitations of the Claim:

said processor is operable to perform the discrete Fourier transform by performing a fast Fourier transform. **para 161;**

Art Unit: 2634

Regarding Claim 9, Kakuishi et al meets the following limitations of the Claim:

a symbol decision device coupled to the adaptive equalizer to receive the equalized signal and **Fig 8, item 106**

generate the error signal based on the equalized signal. **Fig 8, item 107**

Regarding Claim 10, the argument for Claim 1 above meets all the limitations of this Claim.

Regarding the use in a CATV system, Terreault et al meets this limitation in para 003.

Regarding Claim 11, the argument for Claim 2 above meets all the limitations of this Claim.

Regarding Claim 12, the argument for Claim 3 above meets all the limitations of this Claim.

8. Claim 4 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terreault et al(USPUB 2002/0064233) in view of Kakuishi et al(US Pat 5,481,564) further in view of Shteiman(US Pat 6,687,288). Terreault and Kakuishi meet all the limitations of Claims 4 and 13 except disclosing the use of zero-padding in their FFT's in order to process a power of two number of coefficients.

However, Shteiman meets the following limitations of the Claim:

said processor is further operable to augment the equalizer coefficients with a number of zero coefficients sufficient to produce a number of coefficients that is a power of two prior to performing the fast Fourier transform. (**Column 7, lines 19-32**)

Therefor it would have been prima facie obvious to combine Terreault with Kakuishi and Shteiman to zero-pad an FFT computation. The motivation to combine is that it is well known in the art and Digital Signal Processing that FFT computation take less iterations when using an even number of coefficients(Please see section 8.11 of *Discrete Time Signal Processing* by Oppenheim, Schafer and Buck).

Art Unit: 2634

Regarding Claim 14, Terreault et al meets the following limitations of the Claim:

step b) further comprises determining a plurality of phase angles from the computed discrete Fourier transform, the plurality of phase angles constituting the phase response. **para 161**

Regarding Claim 15, Terreault et al meets the following limitations of the Claim:

step b) further comprises determining a plurality of phase angles from the computed discrete Fourier transform, the plurality of phase angles constituting the phase response. **para 161**

9. Claim 5, 7-8, 16-17, 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terreault et al(USPUB 2002/0064233) in view of Kakuishi et al(US Pat 5,481,564) further in view of Wardle(US Pat 6,046,595). Terreault and Kakuishi meet all the limitations of Claims 5, 7-8, 16 except calculating the group delay of a cable network using a slope or a derivative.

However, Wardle meets the following limitations of Claims 5, 7-8, and 16:

5. ...the processor (**fig 1, item 42**) is operable to generate the group delay by determining the slope between the phase angles in order to determine an equalizer group delay. (**Column 3, 57-67**)

7. ... fitting a function to the phase angles **Abstract**
computing a first derivative of the function. (**Column 1, lines 21-31**)

8. ... computing a difference between two phase angles; (**Column 1, 32-44**)

computing a difference between the frequencies corresponding to the two phase angles to generate a group delay measurement for the channel. (**Column 1, 32-44**)

16. ... c) further comprises determining a slope between at least two of the phase angles. (**Column 3, 57-67**)

Therefor it would have been prima facie obvious to combine Terreault with Kakuishi and Wardle to calculate a group delay using a derivative of the slope of a phase vs frequency curve. The motivation to combine is that Wardle states that this a "traditional"(Column 1, Line 33) way of computing group delay, therefor it is implied that it was well known in the art at the time of the invention. Moreover, it is also well known in differential calculus that the derivative of a function gives the ratio of the rate of change of two variables. Since

Art Unit: 2634

group delay is defined as the ratio of the change of phase over frequency, it would have been an obvious step for those skilled in the art to take the derivative.

Regarding Claim 17, Wardle meets the limitations of the Claim above including the use of "a scaling factor" in Column 4, Lines 42-61.

Regarding Claim 19-20, Wardle meets the limitation of the Claim above in the rejection for Claim 7 including the use of a linear regression fitting function in his abstract.

Regarding Claim 21, Wardle meets the limitations of the Claim above in the rejection for Claim 8.

Allowable Subject Matter

10. Claim 6 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. Claim 22 is allowed.

Art Unit: 2634


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry Vartanian whose telephone number is 703.305.8698. The examiner can normally be reached on 10:00-6:30 Mondays to Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703.305.4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Harry Vartanian
Examiner
Art Unit 2634

HV



STEPHEN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800